UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,250	07/02/2001	William P. Niedringhaus	2272.0940000/LEH	7717

28393 7590 07/06/2006

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVE., N.W.
WASHINGTON, DC 20005

EXAMINER	
CHOI, PETER H	

ART UNIT	PAPER NUMBER
3623	

DATE MAILED: 07/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/895,250	NIEDRINGHAUS, WILLIAM P.	
	Examiner	Art Unit	
	Peter Choi	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, and 3-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/5/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a **FINAL** office action upon examination of application number 09/895,250. Claim 2 has been canceled. Claims 1 and 3-15 have been amended and are pending in the application and have been examined on the merits discussed below.

Response to Arguments

2. Applicant's arguments with respect to claims 1 and 3-15 have been considered but are moot in view of the new ground(s) of rejection, as necessitated by amendment.

3. In the previous Office Action mailed October 6, 2005, notice was taken by the Examiner that certain subject matter is old and well known in the art. Per MPEP 2144.03(c), these statements are taken as admitted prior art because no traversal of these statement were made in the subsequent response. Specifically, it has been admitted as prior art that it is old and well known:

- That the relationship between an airline and airport impacts the placement and number of an airline's terminals on the tarmac

- That attributes and/or parameter settings of a simulation model can be changed to represent different strategies, and simulated events of different attribute settings may result in improved performance
- That passenger demand data may be explicitly entered into a simulation model as parameter settings (i.e., 40% of travelers are business travelers, 60% are leisure travelers; travel on Sundays are 20% higher than travel on Wednesdays; etc.) or raw data (i.e., 64 passengers on Flight 123 to LAX at 7 AM, 234 passengers on Flight 654 to ATL at 5PM, etc.)
- That statistical models are applied to raw data in order to reveal patterns and trends (i.e., 40% of customers are business travelers, travel is 20% higher on Sundays than Wednesdays, etc.)
- That the aircraft states of boarding, request take-off, take-off, enroute, request landing, landing, and idle are old and well known in the airline arts
- That air traffic controllers are constantly monitoring the status of aircraft (air traffic of aircraft on the tarmac for arrivals and departures, aircraft in the air enroute to their destination, etc.) and maintain radio contact in order to monitor for unplanned circumstances (changes in weather patterns, mechanical problems, etc.)
- To simulate an event with the aircraft state during which said event occurs

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 and 3-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Under the statutory requirement of 35 U.S.C. § 101, a claimed invention must produce a useful, concrete, and tangible result. For a claim to be useful, it must yield a result that is specific, substantial, and credible (MPEP § 2107). A concrete result is one that is substantially repeatable, i.e., it produces substantially the same result over and over again (*In re Swartz, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000)*). In order to be tangible, a claimed invention must set forth a practical application that generates a real-world result, i.e., the claim must be more than a mere abstraction (*Benson, 409 U.S. at 71-72, 175 USPQ at 676-77*).

Regarding a useful result, the claimed invention does not yield a result that is specific, substantial and credible. Specifically, the following steps in claim 1 are not specific, substantial or credible:

(d) determining whether to create a new airport within the airline structure; and

(h) determining whether to create a new airline within the airline structure;

The recitation of generic "determining" steps is not deemed to be specific, substantial, and credible because the claimed invention does not convey the specifics of the process or rationale used in these "determining" steps, thereby making it difficult to understand how a specific result based on these non-specific determining steps would be credible. It seems that the decision to create new airports and/or airlines within the existing airline structure is entirely arbitrary. For this reason, the claimed invention also does not yield a concrete result that is substantially repeatable, i.e., a result that produces substantially the same result over and over again. The "determining" steps are purely subjective processes and a lack of a specific determining process would yield a result that is not substantially repeatable.

Claims 3-15 are dependent on claim 1 and thus are also rejected under the same rational.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, and 3-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niedringhaus' "An Agent-Based Model of the Airline Industry" (reference 1-U).

As per claim 1, Niedringhaus teaches a method of simulating the economics of airlines using a processor, comprising the steps of:

(a) entering information into the processor regarding an initial number of airlines and their scheduled flights to create an airline structure **(ACSEM's input consists of a set of airports to model in detail – their capacity (e.g., arrivals/departures per hour) and population served; a starting schedule – a set of airlines, their aircraft, and their scheduled itineraries, arrival/departure times and fares)** [Section 2.1];

(d) determining whether to create a new airport within the airline structure **(AIRPORT_OFFICE: airlines may choose to initiate service at an airport not previously served)** [Section 3.2];

(e) entering data related to current financial conditions of each airline within the airline structure **(ACSEM's input consists of general economic conditions, such as interest rates and availability of venture capital, costs of owning/operating aircraft of various types; AC_BUY: airlines purchase N aircraft; AC_SELL: airlines sell the N aircraft with the worst losses or lowest profits)** [Sections 2.1, 3.2];

(f) individually setting and modifying at least one of the following parameters according to a desired profit for each airline:

fees per airline and per origin-destination **(costs of owning/operating aircraft of various types, fares; BUSI_FARE and LEIS_FARE: adjusting business/leisure fares for each airline and origin-destination served)** [Section 2.1, Section 3.1];

aircraft size **(capacity; RESIZE: adjust the number of seats for each aircraft)** per airline, per aircraft [Section 2.2, Section 3.1];

scheduled departure per airline **(scheduled itineraries, and arrival/departure times; DEPART_TIME: adjust scheduled depart time, for each leg of each aircraft's itinerary)**, per aircraft, per departure [Section 2.1, Section 3.1];

fraction of seats reserved for business **(BUSI_FRAC: adjust the fraction of seats reserved for business passengers for each leg of each aircraft's itinerary)**, per airline, per itinerary leg [Section 3.1]; and

cycles around itinerary, per airline, per aircraft **(scheduled itineraries, arrival/departure times for a set of airlines and their aircraft)**; [Section 2.1]

(g) simulating at least one of the following conditions and modifying said at least one condition according to a predetermined profit margin of each airline:

sell aircraft **(AC_BUY)** [Section 3.2];

buy aircraft **(AC_SELL)** [Section 3.2];

shorten itinerary **(CHANGE_ITINERARY)** [Section 3.2]; and

lengthen itinerary **(CHANGE_ITINERARY)** [Section 3.2];

(i) for each airline in the airline structure, determining scheduled flights available to fly from a point of departure to a point of destination **(listing ways for passengers to travel for each origin-destination airport pair; SCHEDULE_SWAP: consider moving arrival of an aircraft ahead of departure of another aircraft to allow for a passenger transfer)**; [Section 2.3, Section 3.1]

(j) for each said airline in the airline structure entering information concerning passenger demand **(demand function between each airport-pair, for two types of passenger {leisure and business})** [Section 2.1];

(k) entering information concerning leisure passengers and business passengers **(Leisure and Business Passengers]** [Section 2.5];

(l) cyclically simulating a day's traffic at predetermined time intervals for each of said airlines **(Simulating a Day of Air Traffic)** and each of said flights [Section 2.7], comprising the steps of:

requesting what is the state of an aircraft **(delayed flights; on-time vs. late arrivals)** for one of said flight [Sections 2.7, 2.8];

exercising a simulated action in accordance with the state of the aircraft **(lost revenue due to late passengers or missed connections)** [Sections 2.7, 2.8]; and

repeating said steps of the simulating a day's traffic, each predetermined period of time for the day **(the airline reinforces/intensifies/extends certain actions {raise fares, buy more aircraft} if it has a positive result and reverse/retracts certain actions**

{lower fares, avoid buying aircraft} if it has a negative result; each tool typically must be run several times consecutively, enough to spot and exploit any trends) [Section 3, Section 3.1]; and

(m) repeating the steps b-l in sequence to maximize profit **(the airline reinforces/intensifies/extends certain actions {raise fares, buy more aircraft} if it has a positive result and reverse/retracts certain actions {lower fares, avoid buying aircraft} if it has a negative result; each tool typically must be run several times consecutively, enough to spot and exploit any trends)** [Section 3, Section 3.1].

As per (b), (c), and (h), Niedringhaus does not explicitly teach the steps of:

- entering information into the processor regarding the status of the simulation
- eliminating bankrupt airlines from the airline structure
- determining whether to create a new airline within the airline structure.

However, the ACSEM model is an agent-based model that explores the evolution of the airline industry and is used to evaluate the impact of a plurality of operational policies. In order to provide credible results, simulation models inherently contain an initialization phase and an execution phase. The initialization of the ACSEM model requires the user to input initial parameters (general economic conditions, a set of airports, demand, costs, starting schedule, etc.) needed to execute the simulation

[Section 2.1]. The simulation is performed after the user has finished inputting initial conditions. Completion of the simulation provides a finishing schedule, airline metrics (such as, profits, load-factors, revenue passenger-miles), and performance metric information. Hence, the step of entering initialization parameters indicates that the simulation is still in the initialization phase (and not the execution phase) and not yet ready for execution, providing information regarding the status of the simulation and meeting the limitation of the claim.

Official Notice is taken that it is old and well known in the airline industry for airlines to cease operations due to financial difficulties (such as bankruptcy). Official Notice is also taken that it is old and well known in the industry for new entrants to enter the airline industry (new airlines).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to remove bankrupt airlines and explore the merits of introducing new airlines because the resulting combination would model naturally occurring events in the evolution of the airline industry and would also provide important data to be considered by the ACSEM model needed to accurately evaluate the impact of the creation and/or elimination of airlines with regards to possible policy changes, and fluctuations in customer demand and competitor capacity over time.

Official Notice is taken that it is old and well known in the art to add and remove elements from representative models. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to include the step of adding and removing elements from the simulation model, because the resulting combination would model naturally occurring events in the evolution of the airline industry and would also enable users to accurately evaluate and understand the implications of changes within the simulated system with regards to possible policy changes, and fluctuations in customer demand and competitor capacity over time.

As per claim 3, Niedringhaus teaches the method of claim 1, wherein the step (d), said creation of new airports includes determining the location **(the ACSEM model could help analyze future possibilities such as a new runway or airport)** [Section 1].

Niedringhaus does not explicitly teach the step of inputting information regarding the date of creation of new airports. However, the ACSEM model is an agent-based model that explores the evolution of the airline industry and is used to evaluate the impact of a plurality of operational policies. Therefore, Official Notice is taken that it is old and well known in the art at the time of invention to modify the teachings of Niedringhaus to consider the date of creation of new airports because the resulting combination would provide important data to be considered by the ACSEM model needed to evaluate the impact of possible policy changes, and monitor fluctuations in

customer demand and competitor capacity prior to and after the creation of additional airports being serviced by an airline.

As per claim 4, Niedringhaus teaches the method of claim 1, wherein the step (d), said creation of new airports includes determining anticipation parameters **(demand function for each airport-pair, for leisure and business passengers; costs of owning/operating aircraft {at each airport})** [Section 2.1]

As per claim 5, Niedringhaus teaches the method of claim 1, wherein the step (d), said data concerning financial conditions **(general economic conditions, such as interest rates and availability of venture capital)** at each airline includes information on opportunity to sell airport offices **(help analyze future possibilities such as a new runway or airport)** and aircrafts **(buy or sell aircraft)** [Section 1, Section 2.1, Section 3.2].

As per claim 6, Niedringhaus does not explicitly teach the method of claim 1, wherein steps (f) and (g), modifying of each of said parameters and each of said conditions is performed individually while holding the other of said parameters constant.

However, Official Notice is taken that attributes and/or parameter settings of a simulation model can be changed to represent different strategies, and simulated events of different attribute settings may result in improved performance. Thus, it would

have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to modify a single parameter at a time to obtain the old and well known scientific benefit of revealing the strategic impact of a single factor in the performance of the simulated model by modifying a single experimental factor, while holding all remaining factors constant, acting as a control.

As per claim 7, Niedringhaus does not explicitly teach the method of claim 1, wherein the step (j), the information concerning passenger demand is entered as explicit data.

Official Notice is taken that passenger demand data may be explicitly entered into a simulation model as parameter settings (i.e., 40% of travelers are business travelers, 60% are leisure travelers; travel on Sundays are 20% higher than travel on Wednesdays; etc.) or raw data (i.e., 64 passengers on Flight 234 to LAX at 7 AM, 234 passengers on Flight 654 to ATL at 5PM, etc.). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to enter passenger demand as explicit data in order to accurately map the date, time, passenger type, flight, and destination and origin airports of all airline passengers when constructing a simulation model of an airline's operations, which results in realistic and accurate simulation results.

As per claim 8, Niedringhaus does not explicitly teach the method of claim 1, wherein the step (j), the information concerning passenger demand is generated by said processing means in accordance with a predetermined statistical model.

However, Official Notice is taken that statistical models are applied to raw data in order to reveal patterns and trends (i.e., 40% of customers are business travelers, travel is 20% higher on Sundays than Wednesdays, etc.). Thus, it would have been obvious to one of ordinary skill in the art to modify the teachings of Niedringhaus to include the step of generating passenger demand according to a predetermined statistical model, in order to accurately reflect passenger demand, which in turn provides realistic and accurate simulation results.

As per claim 9, Niedringhaus does not explicitly teach the method of claim 1, wherein said step (l), said states of the aircraft include:

boarding;

request take-off;

take-off;

enroute;

request landing;

landing; and

idle.

Official Notice is taken that these aircraft states are old and well-known in the airline arts; thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to include basic aircraft status states in order to accurately simulate an action corresponding to each aircraft status state that impacts profitability and also simulating air traffic, along with the financial ramifications corresponding with resulting flight delays and/or cancellations.

As per claim 10, Niedringhaus does not explicitly teach the method of claim 9, wherein said step of requesting the state of the aircraft is repeated each minute.

However, Official Notice is taken that air traffic controllers are constantly monitoring the status of aircraft (air traffic of aircraft on the tarmac for arrivals and departures, aircraft in the air enroute to their destination, etc.) and maintain radio contact in order to monitor for unplanned circumstances (changes in weather patterns, mechanical problems, etc.). Furthermore, the frequency of status inquiry may be established as a parameter or setting of the simulation model.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to update the state of the aircraft every minute in order to obtain accurate and up-to-date information on the status of an airline's aircraft, in order to simulate the impact of aircraft status (delayed and/or canceled flights, paying passengers boarding flights, etc.) to an airline's economic

status and provide instant feedback and support for any unplanned circumstances (what to do in case of mechanical problems, how to re-route the flight to avoid complex weather systems, unexpected heavy traffic on the tarmac making it impossible to land as planned, etc.).

As per claims 11-15, Niedringhaus does not explicitly teach the steps of:

simulating actions of the "boarding" state, including boarding of passengers with tickets of this flight;

simulating actions of the "request take-off" state, including granting take-off depending on capacity of the airport and demand;

simulating actions of the "take-off" state, including paying a take-off fee;

simulating actions of the "enroute" state, including paying enroute fee, based on fuel consumption and reflecting area congestion;

simulating actions of the "landing" state, including disembarking passengers and collecting fares with discount to penalize late arrival.

However, it is an old and well known step in the simulation arts to simulate an event with the aircraft state during which said event occurs. The simulated actions simply reflect real-world practices, and are needed to accurately and completely simulate an airline's operations by monitoring collection and payment of fees (fuel costs, payment from boarding passengers, penalties assessed for late arrival, etc.), and resource usage (airline crew, crew on the tarmac, air traffic, availability of landing

runways and arrival gates, etc.). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to simulation actions performed during specific states in order to accurately simulate the impact each aircraft status state has on the economic state of an airline.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Leonard Hill disclosed in the March 2000 issue of Air Transport World that Lufthansa Consulting GmbH and Unicon Management Systems developed a General Airline Management Simulation program (Reference 1-U).

Richard Whitaker disclosed in the April 1995 issue of Airline Business that Lufthansa Consulting developed a simulation game as a training tool for airline managers (Reference 1-V).

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Choi whose telephone number is (571) 272 6971. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Peter Choi
Examiner
Art Unit 3623

PC

June 22, 2006

Romain Jeanty
Primary Examiner
Art Unit 3623